Docket No.: S1404.70004US01
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	David B. Spencer et al.
Serial No.:	10/766,298
Confirmation No.:	9344
Filed:	January 27, 2004
For:	HIGH-SPEED MATERIALS SORTING SYSTEM
Examiner:	T. H. Matthews
Technology Center:	3600

Certificate of Mailing Under 37 CFR 1.8(a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as First Class Mail, in an envelope addressed to: Mail Stop Appeal Brief, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: June 18, 2007

Steven J. Henry, Registration No. 27,900

APPELLANT'S BRIEF PURSUANT TO 37 CFR §41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is submitted in furtherance of the Notice of Appeal filed on November 16, 2006, in the above-referenced application.

A petition and fee for a five-month extension of time is enclosed herewith. Any additional fees required for consideration of this paper are authorized to be charged to the deposit account identified on the Transmittal filed herewith.

06/22/2007 TNGUYEN2 00000042 10766298
02 FC:2402 250.00 OP

06/21/2007 HGUTEMA1 00000036 10766289
01 FC:2402 250.00 OP

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST (37 CFR §41.37(c)(1)(i))

The real party in interest for this appeal is the Assignee, Spectramet LLC, a Delaware limited liability company having a place of business at Corporation Trust Center, 1209 Orange Street, Wilmington, Delaware, 19801.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS (37 CFR §41.37(c)(1)(ii))

There are no other appeals, interferences, or judicial proceedings which will directly affect, or be directly affected by, this appeal.

III. STATUS OF CLAIMS (37 CFR §41.37(c)(1)(iii))

Following entry of the Amendment Under 37 CFR §1.116 filed herewith, there are/will be six claims pending in this application when the Board receives this appeal, claims 13, 22-25, and 46.

The status of each of the claims is summarized below:

1. Canceled: claims 1-12, 14-21, 26-45 and 47-61. (Claims 1-9, 14-21, 26-45 and 47-61 are canceled in the Amendment Under 37 CFR §1.116).
2. Withdrawn from consideration: none.
3. Pending: claims 13, 22-25 and 46.
4. Allowed: none.
5. Rejected and appealed: claims 13, 22-25 and 46.

A copy of the pending claims involved in the present appeal is attached hereto as Appendix A.

IV. STATUS OF AMENDMENTS (37 CFR §41.37(c)(1)(iv))

An amendment under 37 CFR §1.116 is being filed concurrently herewith to cancel without

prejudice claims 1-9, 14-21, 26-45 and 47-61 and to rewrite claims 13 and 46 in independent form. As such amendment only cancels claims and rewrites claims 13 and 46 into independent form, it is therefore filed as a matter of right under 37 CFR §1.116, so it shall be assumed that the claims amended and canceled in the amendment have, in fact, been amended and canceled from the application.

V. SUMMARY OF CLAIMED SUBJECT MATTER (37 CFR §41.37(c)(1)(v))

In its various aspects, the claimed (and appealed) subject matter involves generally systems and methods for sorting materials through the use of multiple types of characteristic emissions from the material, and to computer-readable media containing instructions for implementing those methods. The emissions are typically x-ray fluorescence (XRF) emissions in response to x-ray stimulation and optical emissions in response to laser irradiation or electrical discharge used to vaporize some of the material. (Page 7, lines 27-32; Fig. 2; Page 16, line 21 - page20, line 14.)

Without in any way intending to characterize or mischaracterize the claimed subject matter, as the claims speak for themselves, and oversimplifying to aid the Board in its initial understanding, claims 13 and 46 define methods, claims 22 -24 define apparatus, and claim 25 defines articles of manufacture which share the characteristic that material classification is performed in two stages, each considering separately and individually one of the two types of emissions, using one type of emissions to achieve a pool of potential material classifications and then refining the identification/classification from among the candidates determined by initial classifications through the analysis of the second of the types of emissions.

Independent claims 22 and 24 are drawn to a system for classifying material and will be discussed first. In claim 22, the system comprises a classification module (Fig. 2: 216) which (a) receives x-ray fluorescence information representing x-rays fluoresced from the material (and detected by a detector such as 210 or 610), (b) receives optical emissions information representing optical emissions emitted from the material (and detected by a detector such as 212 or 612) and (c) classifies the material based on at least one of the x-ray fluorescence (XRF) information and the optical emissions information. The classifying operation includes reducing the number of potential classifications by analyzing "*only* a first one of [the] two types of emissions", and selecting one of

the reduced number of classifications "by analyzing *only* a second one of the types of emissions" (See, e.g., claim 13[1]; emphasis added.) A slightly different expression is used in claim 24, wherein the system is defined as one in which a number of potential classifications are available, and the system includes inputs to receive x-ray fluorescence information and optical emissions information (e.g., 210, 610, 212, 612); and means (216) for classifying the material based on that emissions information including means for reducing the number of potential classifications "by analyzing *only* a first one of [the] two types of emissions" and means for selecting one of the reduced number of classifications "by analyzing *only* a second one of the two types of emissions that was not analyzed in reducing the number of potential classifications." (Emphasis added.)

Similarly, independent claim 25 is drawn to a computer-readable medium having computer-readable signals stored thereon that define instructions that, as a result of being executed by a computer, control the computer to perform a particular method of classifying material, wherein a number of potential classifications are available. The method comprises (A) detecting x-rays fluoresced from the material; (B) detecting optical emissions emitted from a plasma resulting from a vaporization of a portion of the material; and (C) classifying the material based on the detected x-rays and the detected optical emissions by (1) reducing the number of potential classifications "by analyzing *only* a first one" of the two types of emissions and (2) selecting one of the reduced number of classifications by analyzing "*only* a second one of the two types of emissions" that was not previously analyzed. (Claim 13; emphasis added.)

Claims 13 and 46 define methods with limitations similar to those of claims 22-24 and Applicant is satisfied to have them considered on the basis of the remarks made relative to claims 22-24 as it is believed these claims present the same issues for patentability consideration.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 CFR §41.37(c)(1)(vi))

Review is sought of the rejection of claims 13, 22-25 and 46 under 35 USC 103(a) as unpatentable over Grodzins (US-6801595) in view of Graft.

---

[1] Upon remand, the body of the specification will be amended to include the express language recited in claim 13 as an

VII. ARGUMENT (37 CFR §41.37(c)(1)(vii))

A. The obviousness rejection of every pending claim should be reversed, as the rejections are unsupported and in violation of Federal Circuit case law and the MPEP.

As set forth in MPEP § 2143, three criteria must be met in order to establish a prima facie case of obviousness. First, there must be some specific suggestion or motivation, either in the cited reference(s) or in the knowledge generally available to one of ordinary skill in the art, to modify the reference(s). Second, there must be a reasonable expectation of success. The specific teaching or suggestion to modify the reference(s), as well as the reasonable expectation of success, must both be found in the prior art and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Third, the reference(s) must teach or suggest all of the claimed features.

MPEP § 2142 makes clear that the Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the Examiner does not produce a prima facie case, Applicants are under no obligation to submit evidence of non-obviousness.

In the present application, the Examiner has significantly failed to meet his burden of establishing a prima facie case of obviousness.

First, the cited Grodzins and Graft references, alone or in combination, fail to teach or suggest one or more features of each of Applicants' independent claims; that is, at least one element of each independent claim is entirely missing from both of the cited references. Specifically, both the references fail to teach or suggest any feature relating to "analyzing "*only* a first one of [the] two types of emissions", and selecting one of the reduced number of classifications "by analyzing *only* a second one of the types of emissions" to use the language of claim 22 (the other claims incorporating substantially similar language). The contrary method and apparatus of each reference are discussed below, demonstrating not only how these limitations are absent, but also how they are inconsistent with each of the references.

For this reason alone, the Final Office Action fails to establish a *prima facie* case of obviousness and, therefore, the combination of Grodzins and Graft is improper.

---

original part of the specification.

Second, the Examiner has completely failed to point to any acceptable motivation or suggestion in the prior art *to modify* the teachings of Grodzins with the teachings of Graft to achieve the claimed invention. It is well-established that, to support an obviousness rejection, the Examiner must specifically identify a reasoned motivation to change the prior art or combine prior art teachings so as to result in something that falls within the scope of the claims. *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999) (reversing rejection because specific motivation in the prior art not identified). When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). If the Examiner fails to clearly and particularly identify in the prior art, or in the knowledge of those skilled in the art, or even in common sense, any suggestion, teaching, or motivation to modify a reference, the rejection cannot be maintained. See *Dembiczak*, 175 F.3d 994 (emphasis added). The recent Spreme Court decision in *KSR* is not to the contrary. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 2007 WL 1237837. Valid reasons are still required to be provided.

With respect to such suggestion or motivation, in the present case the Examiner fails to specify any reasonable or compelling motivation to combine the teachings of the references *in a manner that will result in the claimed invention.* Instead, the Examiner merely states on page 6 of the Final Office Action that:

> It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Grodzin (sic) to include the teachings of Graft so that you could screen more precisely for elements having certain characteristics.

Thirdly, as discussed in greater detail below, the alleged motivation provided by the Examiner for modifying Grodzins with the teachings of Graft is not only difficult to understand objectively, but also, moreover, legally unacceptable. What teachings of Graft are to be incorporated into Grodzins? How? Neither Applicants nor the Board should have to guess, but that is precisely the situation the Examiner has created. A motivation to combine must contain a notion of *how* to effect the combination – or it must be apparent. Otherwise, there is no reason to expect success.

The Final Office Action fails to point to any evidence, either in the references themselves or in the knowledge generally available in the art, of a reasonable expectation of success in combining

the references in such a way as to achieve the claimed invention. Most notably, the Final Office Action completely fails to specify or suggest in any manner how one of ordinary skill in the art would practically and realistically combine various elements of the two references to successfully arrive at something that would even remotely resemble the subject matter of Applicants' claims.

Thus, the Examiner has failed to meet his burden with respect to each of the three elements required to establish a prima facie case of obviousness. Failure to meet any one of these elements – a teaching or suggestion of all claim elements, a specific suggestion or motivation to modify the prior art, and a reasonable expectation of success – is sufficient to render such a rejection improper. In the present case, the Examiner's basis for rejection is deficient with respect to all three elements. Accordingly, the rejections must be reversed.

Following below are summaries of the Grodzins and Graft references, as well as a more detailed discussion of the impropriety of the Examiner's rejections based on a combination of these references.

B. Discussion of the Grodzins Reference

Grodzins discloses an apparatus in which a material is irradiated by both x-rays and by a laser – apparently concurrently, to generate an x-ray fluorescence signature and an optical emissions signature. BOTH the x-ray data and the optical signal data are used to identify the material. (Abstract: "[A] processor is included that analyzes and combines the x-ray signal output and the optical signal output to determine the composition of the test material." See also col. 2, lines 48-50; col. 3, lines 5-8; Fig. 1.) In fact, the two emissions are used in a very specific way, one which differs significantly from that of the claimed invention. As Grodzins states, "[t]the data that is contained within the optical signal output is *relative* data concerning the concentrations of elements in the test sample, while the data that is contained within the x-ray signal output is *absolute*." Col. 2, lines 64-67; emphasis added. Accordingly, Grodzins' processor 8 "uses data from the optical signal output and the x-ray signal output about [a] common element *to normalize data contained within the optical signal output*." Col. 3, lines 6-8; emphasis added. The end determination of the test material's composition is made from the calibrated optical signal alone.

At no time does Grodzins ever reduce the number of potential classifications of a subject material by analyzing "*only* a first one of [the] two types of emissions" – x-ray or optical - and

select one of the reduced number of classifications "by analyzing *only* a second one of the types of emissions". Neither does Grodzins ever suggest such an approach. But, of course, the rejection was made under Section 103, not under Section 102. So we must ask whether Graft might suggest a modification of Grodzins along the lines of the claimed invention. The answer, clearly, is negative.

C. Discussion of the Graft Reference

Graft shows a system and method that uses only optical emissions (provided by laser-induced breakdown spectroscopy) to analyze a material. That is, there is no x-ray fluorescence generated in the Graft system or method. Graft teaches that intensity *ratios* of optical emission lines (and only optical emission lines) may be calculated and used as signatures to be matched to a database to identify the presence or absence of specific ions or elements or trace metal compounds in a material sample. Graft, Abstract; col. 2, lines 59-61; col. 3, lines 5-42.

D. Grodzins and Graft Fail to Teach or Suggest All Elements of Applicants' Independent Claims

1. Claim 22.

Claims 13, 22-25 and 46 stand rejected under 35 USC 103(a) as obvious over Grodzins in view of Graft. The rejection should be reversed because the result of combining the references, even if such a combination were proper as proposed in the Office Action, would not be the claimed invention.[2]

Claim 22 is drawn to a system for classifying material The system comprises a classification module to (a) receive x-ray fluorescence information representing x-rays fluoresced from the material, (b) receive optical emissions information representing optical emissions emitted from the material and (c) classify the material based on at least one of the x-ray fluorescence (XRF) information and the optical emissions information. The classifying operation includes reducing the number of potential classifications by analyzing "*only* a first one of [the] two types of emissions", and selecting one of the reduced number of classifications "by analyzing *only* a second one of the types of emissions". (Emphasis added.)

[2] Applicants do not concede the propriety of the combination, but this is a matter that will be addressed separately, below.

In rejecting this claim, the Office Action is somewhat unclear as to *how* the references are to be applied. The Office Action does not point to any portion of either reference for the disclosure of such a classification module. It is incumbent on the Examiner, however, to define how the references are to be applied, limitation by limitation, to justify a rejection. Ex parte Kalliokulju, 2007 WL 1378833 (BPAI May 10, 2007) (No. 2007-0834, Tech. Ctr. 2100) . As stated in that opinion at 3-4:

> In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). "[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability." In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Furthermore, "'there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness' . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." KSR Int'l Co. v. Teleflex Inc., 550 U.S. ___, 2007 WL 1237837, at *14 (quoting In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)).

Here, on page 5 of the Office Action, the Examiner has indicated that "Grodzin (sic) discloses the invention as described above in detail" relative to other claims – method claims – but he does not articulate what aspect(s) of the invention defined in claim 22 is(are) disclosed in Grodzins or where it(they) is(are) disclosed, leaving Applicants to guess. This is improper and requires reversal of the rejection.

The Office Action goes on to say that "Grodzin (sic) does not disclose" various features not recited in claim 22 (apparently leaving Applicants and the Board to assume the Examiner believes, without citation, that the other elements and limitations of claim 22 are to be found somewhere in Grodzin) and then perfunctorily states, again without specific citation, "Graft further discloses the invention as described above." Yet the above-quoted limitations of claim 22 were not present in any claim previously discussed in the Office Action so it is not seen how any "above" discussion of Graft would justify the rejection of claim 22.

Moreover, if a limitation is not found in Grodzins, the Examiner must explain how Graft would supply that limitation, with specific reference to the text and drawings of Graft. Broad, sweeping conclusions do not constitute a basis for a *prima facie* proper rejection. Such reasoning, resting on a lack of detailed citations, amounts to conclusory guesswork.

Indeed, no amount of modification of the apparatus of Grodzins based on the teachings of Graft will lead to the invention of claim 22 even if the hypothesized motivation is accepted as valid (which it is not). The features of claim 22 missing in Grodzins (see above) are also missing in Graft.

In short, the subject matter of claim 22 is in no way rendered obvious, even with the benefit of hindsight, from a combination of Grodzins and Graft, regardless of how one combines those references.

2. Claims 13, 23-25 and 46.

Claims 13, 23-25 and 46, though differing in various respects from claim 22 and from each other, share a common thread, the use of x-ray fluoresced emissions and optical emissions in the manner discussed above, so that the use of information obtained from one type of emissions informs the analysis performed using the other of the types of emissions. Consequently, neither do Grodzins and Graft, alone or in combination, establish that the inventions of any of claims 13, 23-25 and 46 should have been obvious to one skilled in the art when Applicants filed their parent application.

E. There is No Motivation to Combine Grodzins and Graft, and No Reasonable Expectation of Success

Without having explained how either Grodzins or Graft applies to teach the aspects of claim 22 quoted above, the Office Action concludes it would have been obvious to modify the apparatus of Grodzins to include the teachings of Graft, reciting a hypothetical motivation to "screen more precisely for elements having certain characteristics." How such a hypothesized motivation would result in an improvement of Grodzins to "more precisely" screen for elements is entirely unclear. Grodzins employs both XRF and optical emission. Graft employs only optical emission. How would Graft, then, result in more precise screening, and how would it suggest modifying Grodzins?

Applicants suggest this is a figment of the Examiner's imagination and that, even if such a result is possible, the Examiner has given no roadmap to achieving it.

Moreover, it will now be clear that nothing in Graft, Grodzins or the knowledge of one ordinarily skilled in the art would have suggested their combination or, more importantly, that they could be combined to form the claimed invention, since they, in fact, cannot be combined in any way that results in the claimed invention while remaining try to their individual objectives.

There is no teaching in Graft that could have been used to motivate a modification of Grodzins to achieve the invention of claim 22. That is, nothing in Graft would have suggested turning Grodzins into a two-step operation using a first kind of emission by itself to create a candidate set of possibilities and a second, different type of emission by itself to refine the analysis of the material – rather than using XRF to calibrate relative values of optical emissions. Were Graft used to modify Grodzins, the logical combination of those systems and methods would have been to employ the specific ratio technique of Graft in the Grodzins processing of optical emissions data. However, note that since Graft uses *ratios* of optical emissions, it does not require absolute values to get results. The signals being compared, as they are produced by the same laser intensity, will scale together. Hence, the Examiner is not suggesting a mere modification of Grodzins, but a whole new system that basically reduces to being Graft alone since the x-ray part of Grodzins becomes superfluous. There would be no motivation to use the more complicated normalization technique of Grodzins on the data produced in Graft. To do so involves complexity and inefficiency without, it would seem, any material improvement in results. Hence, it would be illogical to make such a combination and even if the combination were made, the result would either be a Graft-like system to which normalization is applied to the optical signals so that the ratios are formed of normalized values (presumably being the same or substantially the same ratios as are obtained from the non-normalized signals) or a Grodzins-like system in which the optical processing would be of multiple optical signals, to form ratios. Either way, the result is not the claimed invention or anything that works in a similar way. The only similarity would be that materials identification is being performed through the use of both x-ray and laser-induced stimulation of emissions from the material under examination. But Applicants do not claim to have invented –broadly speaking – the use of both sources of radiation. Rather, Applicants claim a specific approach to a method,

apparatus and product that, in an unobvious way, uses both kinds of stimuli evaluated in succession to achieve a materials analysis that is accurate and can be performed at high speeds.

To be sure, Graft (like Grodzins) does mention the use of x-ray excitation of a material in addition to optical excitation. Nothing new here. But Graft does not do so in the manner claimed or for the reason behind the claims. Rather, Graft mentions that he used x-ray diffraction to identify certain samples of ore as comprising samples having the mineral apatite or samples having the mineral dolomite. Col 7, lines 20-25 et seq. Graft was looking for a way to employ optical spectra, apparently, *instead* of x-ray diffraction spectra, to identify minerals in ore samples and he engaged in experiments to cross-check his results, seeking specific effective laser frequencies and optical emissions ratios to define signatures usable for identifying specific minerals. Thus, Graft found "[t]he significant difference between apatite and dolomite is the presence of a peak near 483 nm in the apatite spectrum that is not present in the dolomite spectrum." Col. 9, lines 18-20. So, if looking for apatite and wanting to assure that the results were representative of apatite and not dolomite, one would investigate 483 nm and compare the results with the signal at some other wavelength. Once Graft had established that it was possible to correlate results of x-ray diffraction with results of optical emissions, therefore, he no longer had need for x-ray diffraction and, indeed, his invention does not employ x-ray diffraction at all.

Graft acknowledged the use of gamma-ray and x-ray fluorescence techniques for "accept/reject" mineral identification in samples on moving belts (Col. 1, lines 22-35), but he then goes on to explain how laser-induced breakdown spectroscopy (LIBS) has been shown to be practical in situations which require very fast, real-time measurements with no sample preparation. Col. 2, lines 40-42. The apparent message is that x-ray fluorescence and the like are not fast enough for his purposes. Indeed, that is one of the serious challenges in the use of XRF that Applicants have spent a great deal of time and money addressing, going against such teachings to find ways that high-speed XRF can be made possible. One of ordinary skill in the art, therefore, would read Graft as teaching *away* from the use of x-ray diffraction as a tool for use in a high-speed materials identification system. Hence, one would not have gleaned from Graft any notion of effecting a combination with Grodzins. By painting with a broad brush, the Examiner fails to perceive the importance of the claimed limitations or the failure of Graft to suggest a modification of Grodzins meeting the claim language.

For like reasons, the references also fail to suggest a combination meeting the limitations of claims 13, 23-25 and 46.

VIII. CONCLUSION

In sum, the Examiner has failed to meet his burden with respect to each of the three elements required to establish a *prima facie* case of obviousness. Failure to meet any one of these elements – a teaching or suggestion of all claim elements, a legally adequate, specific suggestion or motivation to modify the prior art, and a reasonable expectation of success – is sufficient to render such a rejection improper. In the present case, the Examiner's basis for rejection is deficient with respect to all three elements.

Accordingly, the rejection of the claims is improper and should be reversed.

Dated: June 18, 2007

Respectfully submitted,

By_____
Steven J. Henry
Registration No.: 27,900
WOLF, GREENFIELD & SACKS, P.C.
Federal Reserve Plaza
600 Atlantic Avenue
Boston, Massachusetts 02210-2206
(617) 646-8000

X6/16/2007x

APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/766/298

1-12. (Cancelled)

13. (Previously presented) A method of classifying material, wherein a number of potential classifications are available, the method comprising acts of:

(A) detecting x-rays fluoresced from the material;

(B) detecting optical emissions emitted from a plasma resulting from a vaporization of a portion of the material; and

(C) classifying the material based on the detected x-rays and the detected optical emissions, including acts of

(1) reducing the number of potential classifications by analyzing only a first one of two types of emissions: the detected x-rays or the detected optical emissions; and

(2) selecting one of the reduced number of classifications by analyzing only a second one of the two types of emissions that was not analyzed in the act (C)(1);

wherein

the act (C)(1) includes analyzing only the detected optical emissions and

the act (C)(2) includes analyzing only the detected x-rays.

14 - 21. (Canceled)

22. (Previously presented)) A system for classifying material, comprising:

a classification module to receive x-ray fluorescence information representing x-rays fluoresced from the material, to receive optical emissions information representing optical emissions emitted from the material, and to classify the material based on at least one of the x-ray fluorescence information and the optical emissions information, the classifying including reducing the number of potential classifications by analyzing only a first one of two types of emissions: the

detected x-rays or the detected optical emissions; and selecting one of the reduced number of classifications by analyzing only a second one of the two types of emissions that was not analyzed in reducing the number of potential classifications.

23. (Previously presented) The system of claim 22, further comprising:

an x-ray detector to detect the x-rays fluoresced from the material;

an optical emissions collector to detect the optical emissions emitted from the material.

24. (Previously presented) A system for classifying a piece of material, wherein a number of potential classifications are available, comprising:

one or more inputs to receive x-ray fluorescence information representing x-rays fluoresced from the material and optical emissions information representing optical emissions emitted from the material; and

means for classifying the material based on the x-ray fluorescence information and the optical emissions information including means for reducing the number of potential classifications by analyzing only a first one of two types of emissions: the detected x-rays or the detected optical emissions and means for selecting one of the reduced number of classifications by analyzing only a second one of the two types of emissions that was not analyzed in reducing the number of potential classifications.

25. (Previously presented) A computer-readable medium having computer-readable signals stored thereon that define instructions that, as a result of being executed by a computer, control the computer to perform a method of classifying material, wherein a number of potential classifications are available, the method comprising acts of:

(A) detecting x-rays fluoresced from the material;

(B) detecting optical emissions emitted from a plasma resulting from a vaporization of a portion of the material; and

(C) classifying the material based on the detected x-rays and the detected optical emissions, including acts of

(1) reducing the number of potential classifications by analyzing only a first one of two types of emissions: the detected x-rays or the detected optical emissions; and

(2) selecting one of the reduced number of classifications by analyzing only a second one of the two types of emissions that was not analyzed in the act (C)(1).

26 -45. (Canceled)Previously presented)

46. (Previously presented)) A method of classifying material, the method comprising acts of:

(A) applying an electrical discharge to vaporize a portion of the material to produce a plasma;

(B) detecting optical emissions emitted from the plasma;

(C) detecting x-rays fluoresced from the material; and

(D) classifying the material based on the detected x-rays and/or the detected optical emissions;

wherein the act (D) comprises:

(1) reducing the number of potential classifications by analyzing only a first one of two types of emissions: the detected x-rays or the desired detected optical emissions; and

(2) selecting one of the reduced number of classifications by analyzing only a second one of the two types of emission that was not analyzed in the act (D)(1).

47-61. (Canceled)

APPENDIX B

EVIDENCE (37 CFR §41.37(c)(1)(ix))

No evidence pursuant to §§1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

RELATED PROCEEDINGS (37 CFR §41.37(c)(1)(x))

No related proceedings are referenced in Section II. above. Hence, no copies of decisions in related proceedings are provided.